# PULP & PAPER

September 1987

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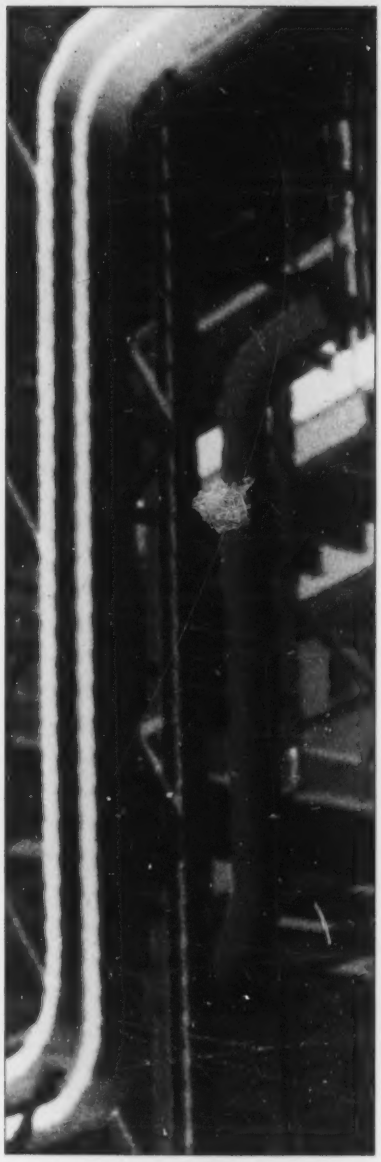

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***Modern CADD (computer-aided design and drafting) systems allow engineering clients to visualize three-dimensional layouts of proposed designs. Story begins on p. 60.*** **(Photo courtesy Jaakko Pöyry Oy, Helsinki, Finland.)**

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# SEPTEMBER

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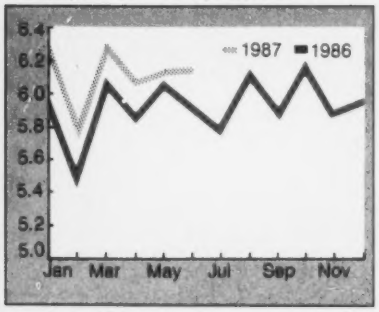
Daishowa restarts newsprint machine

**U.S. paper and board production**




**U.S. production** of paper and paperboard totaled 6.1 million tons in June, an increase of 4.1% from a year earlier, according to American Paper Institute data. Production through the first half of 1987 held steady at record-high rates, API reported. The seasonally adjusted rate averaged 72.5 million tpy for the first six months, up 4.2% from June 1986 and 2.3% higher than the 1986 total. Paperboard continued to exhibit the most strength, with production through June 5.2% above the year-earlier rate.

**Among major grades,** record fiber box demand continued to fuel growth in containerboard, as kraft linerboard climbed 6.0% and semichemical medium 5.6% from last year. Coated paper production jumped 9.7% in response to strong demand from commercial printers and book publishing. Improved business in commercial printing and office copy paper helped offset new capacity additions in uncoated free-sheet, which rose 3.4% in June.

**Canadian newsprint** shipments in the first half were up 6.6% compared with 1986, while woodpulp exports gained 3.7%. Newsprint mills operated at 97% of capacity in June, fueling a 6.3% increase in June shipments. Woodpulp shipments jumped 12.8% for the month, with mills operating at 98%. ■

| | Latest month (000 short tons) | | % change from year ago | Annualized year-to-date (000 short tons) | % change from year ago |
|---|---|---|---|---|---|
| **PAPER & PAPERBOARD PRODUCTION[1]** | | | | | |
| Newsprint | June | 490 | 5.8 | 5,717 | 2.4 |
| Uncoated groundwood (s) | June | 121 | −1.6 | 1,527 | 1.5 |
| Coated paper (s) | June | 569 | 12.9 | 6,631 | 9.7 |
| Uncoated free sheet (s) | June | 903 | 3.0 | 10,658 | 3.4 |
| Other printing/writing | June | 109 | −12.8 | 1,376 | 1.0 |
| Total packaging and other paper (s) | June | 409 | −1.9 | 5,110 | −0.6 |
| Tissue | June | 438 | 4.5 | 5,213 | 2.1 |
| **Total paper** | **June** | **3,038** | **3.8** | **36,232** | **3.2** |
| Unbleached kraft paperboard | June | 1,588 | 5.3 | 18,472 | 5.6 |
| Semichemical medium | June | 466 | 3.1 | 5,604 | 5.6 |
| Bleached paperboard | June | 347 | 0.0 | 4,405 | 3.1 |
| Recycled paperboard | June | 709 | 5.7 | 8,549 | 5.3 |
| **Total paperboard** | **June** | **3,110** | **4.4** | **37,030** | **5.2** |
| **Total U.S. paper and paperboard output** | **June** | **6,149** | **4.1** | **73,262** | **4.2** |
| **PULP, WASTEPAPER & FIBER[2]** | | | | | |
| Total U.S. woodpulp production | May | 4,875 | 2.2 | 58,740 | 3.7 |
| Market pulp production | May | 636 | 2.1 | 7,812 | 6.3 |
| Wastepaper consumption at paper/board mills | May | 1,500 | 4.0 | 17,361 | 3.7 |
| Pulpwood consumption (cords) | May | 7,582 | 1.1 | 93,350 | 2.7 |
| **CONVERTED PRODUCTS STATISTICS[3]** | | | | | |
| Corrugated box shipments (billion ft²) | June | 25.620 | 9.0 | 147.204[6] | 4.5 |
| Containerboard inventories at U.S. box plants and mills | June 1 | 2,383 | −0.5 | | |
| **INTERNATIONAL TRADE[4]** | | | | | |
| U.S. paper imports (including products) | May | 1,024 | 2.8 | 12,394 | 10.0 |
| Imports of Canadian newsprint | May | 737 | 1.4 | 8,681[6] | 5.9 |
| U.S. paper exports (including products) | May | 402 | −1.5 | 4,996 | 7.2 |
| Exports of unbleached kraft linerboard | May | 164 | −6.3 | 2,174 | 8.7 |
| Exports of woodpulp | May | 377 | 3.3 | 4,599 | 3.8 |
| Norscan pulp inventories[4] | June 30 | 795 | −17.2 | | |
| Norscan pulp operating rates[4] | June | 100% | 93% | 100% | 96% |
| **CANADIAN STATISTICS[5]** *(reported in metric tons)* | | | | | |
| Total newsprint shipments | June | 857 | 6.3 | 4,841[6] | 6.6 |
| Operating rates | June | 97% | 94% | 98% | 93% |
| Inventories held by U.S. consumers | June 30 | 1,392 | 1.9 | | |
| Other paper/board shipments | June | 524 | 7.6 | 3,169 | 6.4 |
| Woodpulp shipments (export only) | June | 767 | 12.8 | 3,983 | 3.7 |
| Operating rates | June | 98% | 92% | 97% | 90% |

1. American Paper Institute. 2. API, Bureau of Census, American Pulpwood Assn. 3. Fibre Box Assn., Paperboard Packaging Council. 4. North American/Scandinavian paper-grade market pulp. 5. Canadian Pulp & Paper Assn. 6. Not annualized. (s) = Shipments.

## UNCOATED GROUNDWOOD: Prices paddle slowly upstream as demand rises

**Grade structure:** Uncoated groundwood papers can be considered value-added newsprint—the physical properties have been enhanced by superior brightness and smoothness. At the higher end of the spectrum, supercalendering adds a finish that allows these papers to compete with lightweight coated (LWC) groundwood papers in the marketplace. Typically, brightness levels range from 64 to 72 Elrepho compared with 56 to 62 for standard newsprint. Major end uses include Sunday magazines, preprinted inserts, catalogs, directories, and forms. Basis weights range from 20 to 45 lb/3,300 ft².

**Production/capacity:** U.S. shipments of uncoated groundwood papers rose a meager 0.5% to 1.523 million short tons in 1986. Canadian shipments, on the other hand, rose to 1.225 million metric (1.357 million short) tons in 1986, a healthy 18.0% increase over 1985, according to the Canadian Pulp & Paper Assn.

These figures may not be entirely accurate, since U.S. government definitions of uncoated groundwood and newsprint for tariff purposes include, for example, rotonews in newsprint. Canadian production and shipments of groundwood specialties in 1986 probably hit at least 1.8 million metric tons, and maybe even rose above 2 million tons.

Canadian producers are expected to increase uncoated groundwood capacity by 10.8% between 1986 and 1987, according to CPPA figures, while the American Paper Institute shows U.S. capacity dropping by almost 3.0%, reflecting shutdown of some capacity at one of Great Northern Paper Co.'s Maine mills. Canadian capacity is expected to rise another 3.9% in 1988, and U.S. capacity will increase 6.5% that year. Projects in Canada include machine conversions by Abitibi-Price at its Kenogami and Alma mills in Quebec.

**Outlook:** The remainder of 1987 should prove generally upbeat for uncoated groundwood mills.

Production from several new coated groundwood paper machines caused prices for LWC grades to decline in 1986 and through the first half of 1987. This put pressure on the uncoated groundwood market, particularly prices for premium supercalendered (SC) grades. Coated groundwood prices have recently begun to firm, although overcapacity in LWC grades could persist into 1988. If this occurs, then premium uncoated groundwood grades could feel pressure from the startup of new SC machines at St. Marys Paper in Sault Ste. Marie, Ont., and Lake Superior Paper Industries in Duluth, Minn.

Competitive pricing and improved quality encouraged some uncoated groundwood buyers to switch to coated papers, especially in catalog, insert, supplement, and cents-off-coupon printer markets.

While some market share may have been lost to coated grades, uncoated groundwood demand is being helped by a narrowing of the usual price gap between newsprint and supercalendered paper. This has caused some shifting from newsprint to SC paper in commercial printing applications, such as inserts and catalogs.

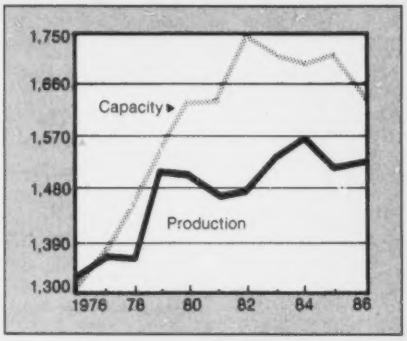
With demand projected to rise 1.8% and capacity declining, U.S. uncoated groundwood mills may achieve close to a 98% operating rate in 1987, following about 94% in 1986 and 89% in 1985.

Imports of uncoated groundwood paper into the U.S. from outside North America (mainly SC grades) are expected to remain at a fairly high level, despite the decline of the dollar. Some new lightly pigmented grades, which are positioned between SC and LWC, have begun to enter the U.S. market from European mills.

**Prices:** A price increase July 1 helped push up SC prices, and increases on directory, rotonews, and offset also took effect bringing prices to about 1986 levels.

List prices for 34-lb supercalendered ($/short tons) are: 1983, $638; 1984, $708; 1985, $780; 1986, $735; and midyear 1987, $710. Prices for 35-lb offset, 65 brightness are: 1985, $544; 1986, $537; midyear 1987, $595. For 30-lb standard rotonews: 1985, $510; 1986, $493; midyear 1987, $553. For 15-lb, 65 brightness forms: 1985, $518; 1986, $520; and midyear 1987, $660.

### SUPPLY/DEMAND (000 tons)




### FORECAST (000 tons)

| | 1985 | 1986 | 1987e |
|---|---|---|---|
| Production[1] | 1,516 | 1,523 | 1,548 |
| Capacity | 1,710r | 1,621 | 1,573 |
| Utilization rate | 88.7r | 94.0 | 98.4 |
| Imports | 1,027 | 1,028 | 1,159 |
| Exports | 37 | 41 | 48 |
| Apparent U.S. consumption | 2,506 | 2,510 | 2,659 |
| lb/capita | 20.93 | 20.77 | 21.88 |
| GNP ratio | 1.40 | 1.37 | 1.41 |

e = estimate.
r = revised.
1. American Paper Institute.
2. 000 tons/$billion real GNP (1982).

### TOP U.S. PRODUCERS (000 tpy)

| Company | Annual capacity U.S. | Canada | Market share Total | (%) |
|---|---|---|---|---|
| **1.** CIP | — | 425 | 425 | 12.2 |
| **2.** Abitibi-Price | — | 405 | 405 | 11.6 |
| **3.** MacBlo | — | 400 | 400 | 11.5 |
| **4.** ConBath | — | 375 | 375 | 10.8 |
| **5.** Boise | 40 | 300 | 340 | 9.8 |
| **6.** GNN | 270[1] | — | 270 | 7.7 |
| **7.** Champion | 200 | — | 200 | 6.3 |
| **8.** Madison | 200 | — | 200 | 5.7 |
| **9.** Domtar | — | 190 | 190 | 5.5 |
| **10.** James River | 155 | — | 155 | 4.4 |

Market share of top five companies: **55.9%**

Market share of top ten companies: **85.5%**

North American capacity (1987): **3.484e million short tons[2]**
U.S.: **1,573** Canada: **1.911e**

1. Not including an additional 130,000 tpy groundwood swing capacity coated/uncoated.
2. *Pulp & Paper* estimate, higher than official Canadian figures.

*SALES & EARNINGS*

# U.S. profits still on a roll with 71% rise

The U.S. paper industry is continuing to enjoy a strong profit recovery, with second-quarter earnings up 71% on increased sales of 15.8% compared with the same period of 1986, according to a *P&P* survey of results from 30 companies. This follows a near doubling of profits in first quarter 1987.

Among the strongest second-quarter performers were companies with major exposure to linerboard, market pulp, and newsprint, where prices have been rising due to strong demand and the weak dollar. Margins of printing and writing paper producers have been under pressure from price discounting caused by overcapacity, but increases have been announced on a number of grades for the third quarter. Squeezed the hardest have been many nonintegrated paper and board mills that have been hurt by rising market pulp and wastepaper costs.

*TABLE 1:* **U.S. paper industry results for second quarter 1987.**

| | ($000) Second quarter | | | |
|---|---|---|---|---|
| **Companies** | **Sales** | **Change 1987/86** | **Earnings[1]** | **Change 1987/86** |
| Boise Cascade | $935,960 | 0.02% | $35,230 | 12.4% |
| Bowater Inc. | 297,952 | 31.5 | 16,752 | −0.07 |
| Champion Intl. | 1,161,015 | 5.9 | 59,910[2] | 18.7 |
| Chesapeake | 175,045 | 13.3 | 7,137 | 140.1 |
| Consolidated | 177,448 | 7.4 | 19,128 | −23.2 |
| Federal Paper | 240,990 | 13.9 | 8,574[2] | 13.9 |
| Fort Howard | 472,543 | 19.9 | 48,351 | 3.4 |
| Georgia-Pacific | 2,095,000 | 8.6 | 111,000[2] | 29.1 |
| P. H. Glatfelter | 102,026 | 39.3 | 14,203 | 31.5 |
| GN Nekoosa | 575,100 | 14.5 | 44,900[2] | n.m. |
| International Paper | 1,910,000 | 55.3 | 90,000 | 18.4 |
| James River (4/26) | 1,191,363 | 71.7 | 45,817 | 98.9 |
| Jefferson Smurfit | 270,565 | 13.6 | 19,945 | 196.0 |
| Kimberly-Clark | 1,224,400 | 12.6 | 83,800 | 21.5 |
| Longview (4/30) | 140,731 | 22.6 | 15,405 | 114.8 |
| Louisiana-Pacific | 488,800 | 24.0 | 34,800[2] | 42.0 |
| Mead Corp. | 1,078 | 40.3 | 51,900 | 40.7 |
| Mosinee Paper | 53,378 | −37.4 | 1,131 | −37.4 |
| Pentair Inc. | 196,324 | 46.8 | 2,946 | −22.0 |
| Pope & Talbot | 106,288 | 39.6 | 7,211 | 99.0 |
| Potlatch Corp. | 243,918 | −2.4 | 22,317 | 14.9 |
| Scott Paper | 1,029,400 | 24.1 | 58,800 | 4.4 |
| Sonoco Products | 342,718 | 38.8 | 18,434 | 19.8 |
| Stone Container | 830,900 | 57.4 | 32,500 | 828.6 |
| Temple-Inland | 395,100 | 26.0 | 35,800 | 85.5 |
| Union Camp | 577,567 | 15.7 | 47,812 | 67.2 |
| Wausau (5/31) | 63,777 | 10.5 | 2,901 | −12.5 |
| Westvaco (1/31) | 461,145 | 5.8 | 24,299 | 30.3 |
| Weyerhaeuser | 1,769,114 | 18.2 | 89,183 | 30.4 |
| Willamette | 352,350 | 13.7 | 27,777 | 43.6 |
| **Total** | **$17,881,995** | **15.8 %** | **$1,077,960** | **71.0%** |

n.m. = Not meaningful.

1. Income after taxes, from continuing operations, excluding most significant nonrecurring items in both years.

2. **Champion International:** 1987 quarter excludes net gain of $95.8 million due to sale of certain investments and adjustment of a reserve. **Federal Paper Board:** 1987 quarter excludes $8.3 million charge from early redemption of debentures. **Georgia-Pacific:** 1987 quarter excludes a net gain for $37 million from sale of Georgia Gulf Corp. and includes a pretax gain of $6 million from redemption of stock. **Great Northern Nekoosa:** 1986 quarter includes a net charge of $21.2 million for restructuring operations. **Louisiana-Pacific:** 1986 quarter includes pretax gain of $4 million from sale of a sawmill and investment writedowns.

Sales at International Paper Co. were up 55% while earnings rose 18%. John A. Georges, chairman and CEO, attributed the improvement to low worldwide inventories for pulp and containerboard, an improving market for coated paper, and stabilization in the uncoated white paper market due to the "near absorption of recent capacity expansions." The income improvement came despite the cost of starting up two large paper machines at Pine Bluff, Ark., and Selma, Ala., and production shortfalls caused by strikes at four of its mills.

James River Corp. ended its fiscal year on Apr. 26 with earnings up 78% compared with the previous year on sales of $4.48 billion. Despite competitive pricing, the company's towel and tissue business showed a 25% improvement over last year. The income from the Dixie products business more than doubled. The company noted that income from both recycled and bleached board was "substantially" below the prior year due to difficulty in implementing price increases and rising wastepaper costs.

Champion International Corp. enjoyed a 59% improvement in net income during the first half. Chairman and CEO Andrew C. Sigler noted that the strength of the pulp business and the pickup in newsprint prices, coupled with recent turnarounds in uncoated free-sheet and publication papers, point to a promising second half.

**Pulp makers are coining money.** Weyerhaeuser Co.'s profits were up 61.5% for the first half, thanks to improving pulp, containerboard, and newsprint markets. World pulp inventories are at their lowest level since 1980, noted George H. Weyerhaeuser, president and CEO. Georgia-Pacific Corp. enjoyed a 97% increase in profits during the first half, which it attributed to "continued healthy demand for most forest products and improved productivity." The operating profits for the pulp and paper group reached an all-time high of $88 million during the quarter. Louisiana-Pacific Corp.'s second-quarter earnings set a new company record and were 42% higher than year-earlier levels.

Burnell R. Roberts, chairman and CEO of Mead Inc., foresees no slowdown at all in the industry's momentum during the second half. The company enjoyed a 41% increase in earnings on a similar increase in sales. Roberts noted that world inventories of pulp have been 15% to 20% below normal levels for the past year and Mead's pulp mills are sold out through the third quarter. Mead's containerboard remains sold out, and its coated board mills have been running full-out.

**Paperboard profits healthy.** Containerboard producers reported sharp profit gains, thanks to healthy market conditions and, in some cases, recent acquisitions. Stone Container Corp. reported that its first-half profits of $58.7 million were higher than the company's previous annual earnings record of $35.4 million set just during the last year. "As demand remains strong and further price increases occur, we should see substantial improvements in the second half of 1987 over the fine results we have already achieved," explained Roger W. Stone, chairman, president, and CEO.

Temple-Inland Inc.'s earnings rose 85% due to strong demand and rising prices for paperboard and corrugated boxes. In addition, the results were helped by last year's acquisition of the Orange, Texas, linerboard mill and improved performance from the Ontario, Calif., recycled liner mill.

Federal Paper Board Co. Inc. reported 13.9% increases in both sales and earnings for the quarter. The company's three recycled paperboard mills found their profitability curtailed by higher wastepaper costs. The company's Riegelwood, N.C., mill, which produces bleached market pulp and bleached board, set new production records during the quarter. The company's three recycled paperboard mills found their profitability curtailed by higher wastepaper costs.

**Tissue producers hold their own.** Despite rising raw material costs, tissue producers enjoyed modest profits during the quarter. Fort Howard Corp. resumed its profit growth with a small increase in second-quarter results, as the integration of the company's tissue and cup business began to pay off. During the quarter, its newest tissue machine at the Savannah River mill in Rincon, Ga., set company production records before its July dedication.

Scott Paper Co.'s quarterly sales exceeded $1 billion for the first time in the company's history. Income from the sanitary tissue business rose slightly, despite higher than usual manufacturing costs and the disruption caused by a flood in Maine. Sales from S.D. Warren Co.'s printing and publishing paper business increased 18% to a new record for the second quarter, but the flood and discounting on lightweight coated paper kept earnings flat.

**Coated paper producers lag.** Producers of coated paper generally had a less profitable second quarter than other segments but are hopeful their third-quarter price hike will help them regain some ground. Coated paper demand is strong, and substantially less capacity seems to be available than the market had anticipated.

Bowater Inc. said that all of its businesses, except for coated paper, showed improvement over second-quarter 1986. The company's earnings were equivalent with the year-earlier quarter. Consolidated Papers Inc. saw profits decline 23%, which it largely attributed to price reductions in lightweight coated paper. Pentair Inc. experienced a 22% erosion in profits due largely to the rising cost of market pulp. Mosinee Paper Corp. also attributed its 37% decline in profits to the cost of market pulp. Mosinee is spending $800,000 to expand the capacity of its Sorg Paper Co.'s deinked pulp mill in order to lessen Sorg's dependence upon market pulp. ■

## Canadian profits rose 82.4%, spending plans abound

Second-quarter earnings for Canada's paper and forest products industry rose 82.4% on increased sales of 13.6%. Newsprint and pulp producers continued to enjoy strong demand, and the July 1 price increase on newsprint, as well as the third-quarter price hike on market pulp going to Europe and Japan, will ensure a profitable second half. Many companies said they would spend their profits on upgrading facilities. Second-quarter gains were partially offset by a lower exchange premium on U.S. dollar sales and the 15% export tax on softwood lumber to the U.S.

The C$135 million that MacMillan Bloedel Ltd. earned in first-half 1987 surpassed its entire 1986 profits. Ray Smith, president and CEO, emphasized that this level of profits means MB can spend money to upgrade its facilities. Smith said major factors that contributed to the results were strong markets for all its products, favorable currency fluctuations, and

*TABLE 2:* **Canadian paper industry results for second quarter 1987.**

| | Second-quarter 1987 ($000) | | | |
|---|---|---|---|---|
| **Companies** | **Sales** | **Change 1987/86** | **Earnings[1]** | **Change 1987/86** |
| Abitibi-Price | C$756,400 | 7.8% | C$36,200 | 27.0% |
| B.C. Forest | 344,100 | 6.1 | 32,400 | 62.0 |
| Canfor Corp. | 314,400 | 8.9 | 26,600 | 137.5 |
| Cascades Inc. | 135,240 | 2.0 | 7,592 | −8.3 |
| Consolidated-Bathurst | 533,600 | 11.3 | 43,300 | 173.9 |
| Crown Forest | 256,000 | 5.3 | 22,800 | 117.1 |
| Domtar Inc. | 657,000 | 14.5 | 44,000 | 37.5 |
| Donohue Inc. | 133,100 | 16.3 | 10,000 | 138.1 |
| Great Lakes FP | 183,150 | 11.3 | 20,452 | 302.0 |
| MacMillan Bloedel | 806,800 | 15.5 | 74,600 | 51.9 |
| Noranda | 1,110,000 | 14.1 | 54,100 | 87.2 |
| Paperboard Ind. (2/28) | 21,657 | 17.7 | 980 | 94.4 |
| Repap | 237,000 | 97.5 | 12,100 | 548.1 |
| Rolland Inc. | 97,000 | 18.1 | 2,608[2] | 38.5 |
| Scott Paper Ltd. | 73,045 | 13.0 | 3,611 | 9.5 |
| West Fraser Timber | 111,400 | 14.1 | 11,900 | 19.0 |
| **Total** | **C$5,809,892** | **13.6%** | **$403,243** | **82.4%** |

1. Income after taxes, from continuing operations, excluding most significant nonrecurring items in both years.
2. Rolland: 1987 earnings include C$1.6-million pretax gain from sales of property.

production of more value-added products. Smith expects the good markets to continue through the end of the year, but he noted "we are still playing catch-up after the empty-pockets period of the recession. We need to produce a consistently higher return on invested capital and spend huge sums to modernize our plants."

Abitibi-Price Inc., the world's largest newsprint producer, experienced a 16% improvement in first-half earnings on increased sales of 15%. Bernd K. Koken, chairman and CEO, said the company benefited primarily from stronger markets as well as higher prices for newsprint. He also noted that distribution operations made a "considerably greater contribution, while building products and converted products also posted gains." The third-quarter earnings will benefit from the fact that Abitibi managed to settle a three-year contract with the Canadian Paperworkers Union at its mills in eastern Canada without any strikes. "Even with a 75-cent dollar, earnings for the full year should comfortably surpass those of 1986," Koken predicted.

On the labor front, Consolidated-Bathurst Inc. was not so lucky. Three of its newsprint mills in Quebec were on strike from June 26 to July 8. But offsetting this loss were improved profits from newsprint and bleached kraft pulp, which contributed to a 74% increase in second-quarter earnings. In the company's packaging products sector, Europa Carton of Fed. Rep. Germany and CB Pak Inc. saw profits decline due to a "cost-price squeeze in most product lines."

Domtar Inc. enjoyed a 37.5% earnings increase, which it attributed to higher pulp prices and strong demand for newsprint and groundwood specialties. The fine papers group didn't fare as well due to the high price of pulp. The company also reported that its lumber business suffered from the 15% export duty. Domtar's packaging group raised its profits thanks to increased shipments and selling prices for containerboard.

British Columbia Forest Products Ltd.'s first-half earnings rose 162% over first-half 1986. Strong demand for newsprint and kraft pulp was again the major reason for the good showing. Sales volumes of coated paper from BCFP's Blandin Paper Co. subsidiary improved, but prices were weaker. The company is doing well enough to announce three major capital improvements: a C$33-million expansion of pulp capacity at its Crofton, B.C., mill, a US$350-million upgrade of Blandin, and a C$212-million newsprint and sawmill project in Mackenzie, B.C.

Canfor Corp.'s first-half profits rose 253% thanks to the rising pulp price and the fact that the company's three pulp mills were running full-out. The second half should show an even greater improvement because last year during that period earnings were curtailed by the International Woodworkers Assn. strike. Canfor said additional capital spending will be undertaken to improve operations.

Paperboard Industries Corp. enjoyed a 94% improvement in earnings in the second quarter. In the third quarter, the company bought 98.2% of the shares of Belkin Inc., making it one of Canada's largest packaging firms (*P&P*, July, p. 25). Both companies are integrated manufacturers of recycled linerboard and boxboard. Paperboard now needs more containerboard at its box plants than it has capacity to produce, and Belkin's mills can make up the difference. ■

*EXPANSION/MODERNIZATION*

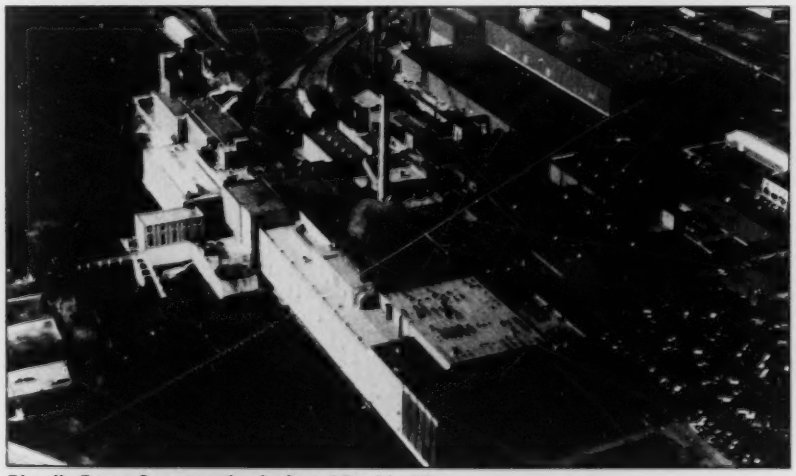
## Blandin goes ahead with 254,000-tpy LWC unit

Blandin Paper Co., a subsidiary of British Columbia Forest Products Ltd., will proceed with construction of a 254,000-short-tpy lightweight coated groundwood paper machine at its Grand Rapids, Minn., mill. The project, currently budgeted at US$344 million, is due to come onstream in December 1989. A Blandin spokesman said the 79% increase in total mill capacity from the current level of 280,000 tpy to about 501,000 tpy will make the company the fourth largest producer of LWC in North America and the largest single site for coated groundwood production in the world. The 37,000-tpy No. 1 machine will be shut down.

The modernization also includes updating the groundwood pulp mill and building a new woodroom. Blandin currently is using hand-fed grinders. Modernization here is expected to help cut overall labor hours by about 40%. In addition, there will be 45 fewer jobs at the paper mill when No. 1 machine, built in 1901, is shut down. The increased consumption of pulpwood will result in the addition of 115 new logging jobs in the region.

Major construction is scheduled to begin in the fall. Company spokesman Ed Zabinsky said the machine will have a 306-in. trim and a design speed of 4,000 fpm.

The expansion is made possible by Fletcher Challenge Ltd.'s purchase of 48% of BCFP last year, which included the purchase of C$119 million in treasury shares from the Canadian company. This capital infusion as well as improved earnings in the last six months have enabled BCFP to reduce its debt load enough to undertake the long-discussed Blandin project. Plans for the new machine were



**Blandin Paper Co. operation in Grand Rapids, Minn.**

# NSSC pulping: specialties strike again

Following a strong year in production, chemical products utilized by neutral sulfite semichemical (NSSC) manufacturers experienced strong growth in terms of tons consumed. Special blends of sodium sulfite and related liquor components fared especially well, as mills chose prepared solutions over those produced via the sulfur burning and the internal makeup process.

NSSC pulp is the principal furnish for semichemical medium, accounting for over 84% of the 5.3 million tons produced in 1986. This is shaping up to be another good year, with production increases year-to-date up 6.2%. Capacity stands at 15,745 tpd and is predicted to grow an average of 1%/year to 1990. (All previous data is courtesy of API.) Worldwide production of semichemical pulp has followed a similar pattern.

Consumption of chemicals used in the pulping process for semichemical pulps has tracked production. Sodium sulfite blends have been a chief benefactor. Sodium carbonate consumption also rose, but not as significantly. Sulfur used in all sulfite production has either remained flat or declined over the past several years.

Mills are using more packaged products from suppliers, like the Neutrapulp product line offered by Koppers Inc. The Neutrapulp products are customized for individual processes and shipped in many forms. Koppers dominates the sodium sulfite market with over two-thirds of U.S. capacity. Upgrades of its plants in Petrolia, Pa., and Tuscaloosa, Ala., (purchased from Reichhold in 1984) have expanded its products across all grades. Four other companies operate plants (two in the East, two in the West). The demand forecast calls for reasonable growth, along with production of semichemical and chemithermomechanical pulp (CTMP), where the prospects are particularly interesting. Sodium sulfite additions in mechanical pulping have increased in strength, lending that furnish to a whole new set of paper grade applications.

Exports of sodium sulfite have doubled recently, primarily due to Pacific Rim demand. Japan, and other countries where wood costs are high, uses sodium sulfite with anthraquinone and other chemicals to increase yield, reduce odors and reduce bleaching costs.

Sodium carbonate consumption is steady. Strong markets in glass containers and decreases in supply have helped soda ash in the past two years, but growth in pulp manufacturing contributes only slightly to the total (use stands at 7% of produced soda ash). Six companies supply ash, five operating plants in Green River, Wyo. Kerr-McGee has decided to complete the shutdown of its Westend, Calif., facility next year.

Sulfur use has declined due to the curtailed use of sulfur burners and liquor makeup processes. Because of high operational costs linked to efficiency problems, economics have dictated that the use of purchased product returns easier than an internal process. Burners remain in use where economical, but many are subsidized by purchased product. Equipment suppliers are offering modern burning systems that have low maintenance and can operate via computer control.

**PRICE.** NSSC and sulfite manufacturers may be subject to price increases soon for many of these chemicals. The cost of sodium sulfite will rise due to the skyrocketing cost of caustic. Sodium carbonate prices have been lackluster for many years, until recently when an increase was forced. Now prices should strengthen again from supply reductions and steady demand. Sulfur, too, is getting some relief for the same reasons, and revised long-term reports on worldwide supply favor North American producers.

—*Michael Ducey*

| Chemical | Paper industry consumption 1986 | % change 1987 | Price ($) 1987 | % change 1988 |
|---|---|---|---|---|
| Sodium sulfite | 111,940 | 6.5% | 24/hundred weight | 10% |
| Sodium carbonate | 784,500 | 1.5% | 80/ton | 5% |
| Sulfur | 55,000 | 0% | 130/metric ton | 0% |

Source: *Chemical Marketing Reporter.*

**Correction.** Our column published in July was in error when it reported the consumption of sodium chlorate in chemical pulp mills. The correct figures should be 422,000 tons for the U.S. and 240,000 tons for Canada. These figures represent a 3% growth over 1985, and this year should follow this trend. *P&P* wishes to thank Kemanord for its help in correcting this mistake.

# MAINTENANCE SURVEY SHOWS EMPHASIS ON PREVENTIVE TECHNIQUES CONTINUES

## Southern U.S. mills are leading the way in maintenance force productivity, use of outside contractors, and preventing downtime

**By KENNETH E. SMITH, Executive Editor**

For the second year in a row, *Pulp & Paper* conducted a survey of maintenance practices in the North American pulp and paper industry. Questionnaires were mailed to approximately 1,000 plant and maintenance engineers in the U.S. and Canada whose names were taken from *P&P*'s Pulp & Paper Industry Personnel Census list. Responses received this year represent a total of 74 mills. (See *P&P*'s September 1986 issue, p. 60 for complete details of the 1986 survey.) Mills responding to the survey produce all major grades of pulp and paper. Annual production capacities range from 6,000 to 1 million tons. Survey data have been tabulated and are presented by region in Table 1. The five regions presented are the U.S. Northeast, Midwest, South, West, and Canada. All figures given are short tons. Table 2 is an interpretation of the survey data and also shows data from last year's survey.

Southern mills responding to the survey average the largest production capacity at 463,786 tpy (Table 1, Section A). Canadian mills report the most recent paper machine modernizations, on average, in 1984. Northeastern mills are both the smallest, with an average production capacity of 162,122 tpy, and the least modern, with their most recent paper machine modernization in 1976, on average.

All Canadian and northeastern mills are unionized (Table 1, Section B). Logically, fewer Canadian mills—only 27%—report flexicraft or multicraft work rules in their maintenance departments, and in only 9% of all Canadian mills can operators perform any maintenance. Southern mills report the most flexible labor rules with only 64% unionization, 85% of mills with flexicraft or multicraft maintenance, and 57% of mills where operators can perform some maintenance. Southern mills report the fewest maintenance job classifications with an average of 6, while Canadian mills are tops in this category with an average of 12. Greater use of flexicraft or multicraft maintenance staffing has required southern mills to provide more training for maintenance workers. Mechanics at these mills are trained an average of 64 hours/year, while electrical and instrument (E&I) people receive 94 hours/year. Canadian workers are the least trained with 13 and 39 hours/year for mechanics and E&I people, respectively.

More flexible work rules apparently allow southern mills to lead all others in contract maintenance utilization (Table 1, Section C). These mills report an average of 20% of their maintenance budgets are spent on contract maintenance. Canadian mills are last in this category with an average of only 12%.

Predictably, more flexible work rules and larger mill size allow southern mills to be the most productive in terms of tpy/maintenance employee (2,899), while the northeastern mills are the least productive at 1,386 tpy/maintenance employee (Table 2). Western mills are the most productive in terms of maintenance manhours per ton of production at 0.62, with southern mills a close second at 0.71. Northeastern mills are also the least productive in this category at 1.54.

**MAINTENANCE EFFECTIVENESS.** Despite their strict work rules, Canadian mills proved to be very effective in their preventive maintenance programs. Canadian mills report an average of only 4% of all downtime caused by equipment failure (Table 1, Section D). Western mills were high in this category at 14%. Canadian mills also led the way in fewest unplanned maintenance jobs at 24%. Midwestern mills were also high at 49%. Unplanned maintenance was determined by asking the percentage of all maintenance jobs begun the same day as initiated. These jobs are assumed to be breakdown related or emergency situations. Southern and western mills also came out well in this category, both reporting an average of 27% unplanned maintenance jobs. In addition, these two regions reported the most frequent use of maintenance planners to assist maintenance supervisors at 93% and 69%, respectively.

Southern and western mills reported the highest average paper machine availability, with both regions at 94% (respondents were asked to base availability on 365 days/year). Canadian and northeastern mills reported the lowest average availability at 91%, probably due to more restrictive labor contracts.

*TABLE 1:* **Maintenance survey data summary.**

| | Northeast | Midwest | South | West | Canada |
|---|---|---|---|---|---|
| **A) Mill data** | | | | | |
| Mills responding | 16 | 16 | 14 | 13 | 11 |
| Production, tpy (short tons) | 162,122 | 167,900 | 463,786 | 351,450 | 274,455 |
| Last paper machine modernization | 1976 | 1980 | 1979 | 1980 | 1984 |
| Total employees | 639 | 652 | 672 | 532 | 767 |
| Total maintenance employees | 17 | 119 | 160 | 138 | 200 |
| Total maintenance mechanics | 73 | 75 | 123 | 112 | 159 |
| Total E & I personnel | 25 | 22 | 33 | 27 | 40 |
| Total maintenance supervisors | 10 | 9 | 14 | 12 | 16 |
| Maintenance manhours/year | 250,040 | 198,420 | 328,436 | 219,500 | 300,937 |
| Percent overtime manhours/year | 12% | 15% | 11% | 11% | 7% |
| Maintenance budget as percent of mill operating budget | 9% | 18% | 26% | 15% | 13% |
| Capital maintenance as a percent of total maintenance budget | 11% | 11% | 10% | 10% | 9% |
| Days/year of mill operations | 353 | 344 | 359 | 362 | 355 |
| **B) Maintenance Work force** | | | | | |
| Mills with unionized maintenance forces | 100% | 88% | 64% | 92% | 100% |
| Mills with flexicraft or multicraft work rules | 63% | 50% | 85% | 62% | 27% |
| Average number of maintenance job classifications | 7 | 9 | 5 | 8 | 12 |
| Mills where operators can perform some maintenance | 27% | 40% | 57% | 50% | 9% |
| Average hours/year training for each mechanic | 26 | 49 | 64 | 35 | 13 |
| Average hours/year training for each E & I person | 58 | 93 | 94 | 71 | 39 |
| **C) Outside contractors** | | | | | |
| Percent maintenance budget spent on outside contractors | 16% | 14% | 20% | 15% | 12% |
| Percent contractors work to capital maintenance | 69% | 63% | 57% | 62% | 59% |
| Mills planning to increase outside contractor use in 1988 | 27% | 33% | 44% | 11% | 50% |
| **D) Maintenance effectiveness** | | | | | |
| Paper machine availability | 91% | 92% | 94% | 94% | 91% |
| Pulp mill availability | 92% | 93% | 95% | 96% | 92% |
| Paper mill equipment efficiency | 84% | 85% | 91% | 86% | 87% |
| Percent downtime due to equipment failure | 11% | 8% | 12% | 14% | 4% |
| Mills that analyze downtime causes | 53% | 50% | 83% | 67% | 73% |
| Mills conducting maintenance force productivity evaluations | 44% | 44% | 50% | 58% | 30% |
| Percent maintenance jobs that are unplanned | 29% | 49% | 27% | 27% | 24% |
| Mills with planners assisting maintenance supervisors | 50% | 57% | 93% | 69% | 64% |
| Mills where maintenance department is involved in planning expansions/modernizations | 75% | 60% | 71% | 85% | 91% |
| **E) Preventive maintenance** | | | | | |
| Mills with "scheduled" preventive maintenance program | 75% | 56% | 100% | 69% | 100% |
| Percent of maintenance budget to preventive maintenance | 10% | 13% | 16% | 14% | 11% |
| Average number of full-time maintenance inspectors | 3 | 2 | 7 | 3 | 4 |
| Mills with permanently installed conditioning monitoring | 21% | 13% | 43% | 31% | 27% |
| Unplanned downtime reduction attributed to preventive maintenance | 17% | 27% | 32% | 24% | 23% |
| **F) Computer-assisted maintenance** | | | | | |
| Mills with computerized work order systems | 63% | 50% | 100% | 69% | 73% |
| Mills with computerized spare parts ordering/inventory system | 56% | 69% | 100% | 69% | 91% |
| Mills with computerized downtime analysis | 25% | 25% | 36% | 8% | 36% |
| **G) Equipment and stores** | | | | | |
| Average number of electric motors in mill | 1,454 | 1,780 | 1,760 | 2,020 | 1,655 |
| Average number of electric motors in stores | 263 | 196 | 286 | 490 | 376 |
| Average number of electric motors replaced each year | 95 | 145 | 99 | 159 | 95 |
| Average number of paper machine dryer bearings in mill | 313 | 304 | 264 | 395 | 390 |
| Average number paper machine bearings replaced each year | 10 | 12 | 14 | 10 | 22 |
| Average number of rotary joints in mill | 80 | 154 | 159 | 155 | 165 |
| Average number of rotary joints replaced each year | 27 | 102 | 50 | 48 | 51 |

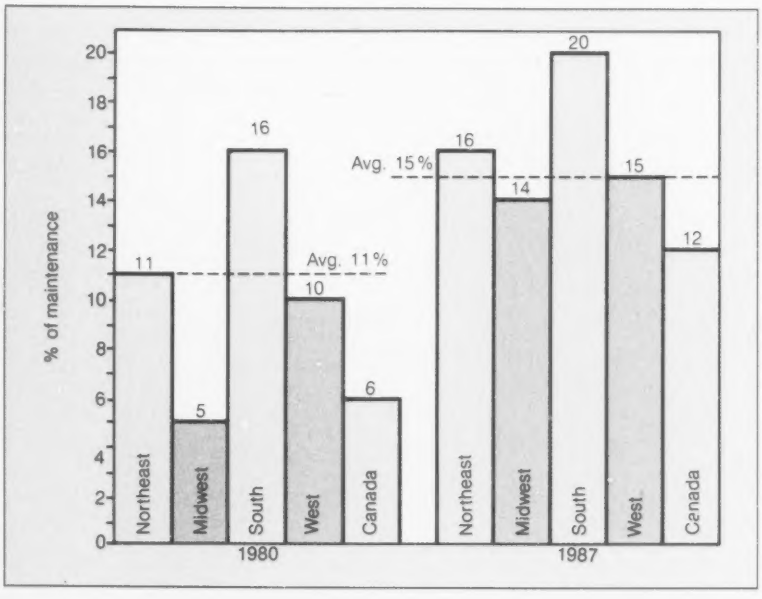



*FIGURE 1:* **Maintenance contractor utilization.**

| | Northeast | Midwest | South | West | Canada |
|---|---|---|---|---|---|
| Production tpy/maintenance employee | | | | | |
| 1986 | 1,127 | 2,532 | 2,012 | 2,199 | 1,203 |
| 1987 | 1,386 | 1,411 | 2,899 | 2,547 | 1,372 |
| Percent maintenance employees/total employees | | | | | |
| 1986 | 21% | 19% | 23% | 27% | 26% |
| 1987 | 18% | 18% | 24% | 26% | 26% |
| Maintenance supervisors/100 mechanics | | | | | |
| 1986 | 15 | 10 | 11 | 10 | 13 |
| 1987 | 14 | 12 | 11 | 11 | 10 |
| Maintenance manhours/ton of production | | | | | |
| 1986 | 1.37 | 0.69 | 0.94 | 0.76 | 1.58 |
| 1987 | 1.54 | 1.18 | 0.71 | 0.62 | 1.10 |
| Average percent electric motors replaced each year | | | | | |
| 1987 | 7% | 8% | 6% | 8% | 6% |
| Average percent dryer bearings replaced each year | | | | | |
| 1987 | 3% | 4% | 5% | 3% | 6% |
| Average percent rotary joints replaced each year | | | | | |
| 1987 | 34% | 66% | 31% | 31% | 31% |

*TABLE 2:* **Survey data evaluation (1986/87).**

Respondents were asked to report Equipment Efficiency, which is based on the following formula:

Equipment Efficiency = % Availability x Quality,
where
Quality = Prime Tons/Prime Tons + Reject Tons.

Southern and Canadian mills came out on top in this category at 91% and 87%, respectively. Despite their contrast in work practices and mill size, these mills also reported the most effective use of preventive maintenance (Table 1, Section E), each having a regularly scheduled preventive maintenance program in place. Southern and Canadian mills also led the pack in the use of computers to handle work orders and for spare parts inventory and ordering (Table 1, Section F). They also led all others in the use of computer analysis of downtime; however, only 36% of these mills have taken their preventive maintenance programs to this step.

Southern mills attribute an average 32% reduction in unplanned downtime to their preventive maintenance programs. These mills report an average of seven full-time preventive maintenance inspectors, and 43% have permanently installed condition monitoring systems. Southern mills lead all others in amount of money spent on preventive maintenance, reporting an average of 16% of their maintenance budgets going for preventive maintenance. Midwestern mills were the least likely to have a preventive maintenance program (56%).

*FIGURE 2:* **Tonnage responsibility of maintenance employees.**

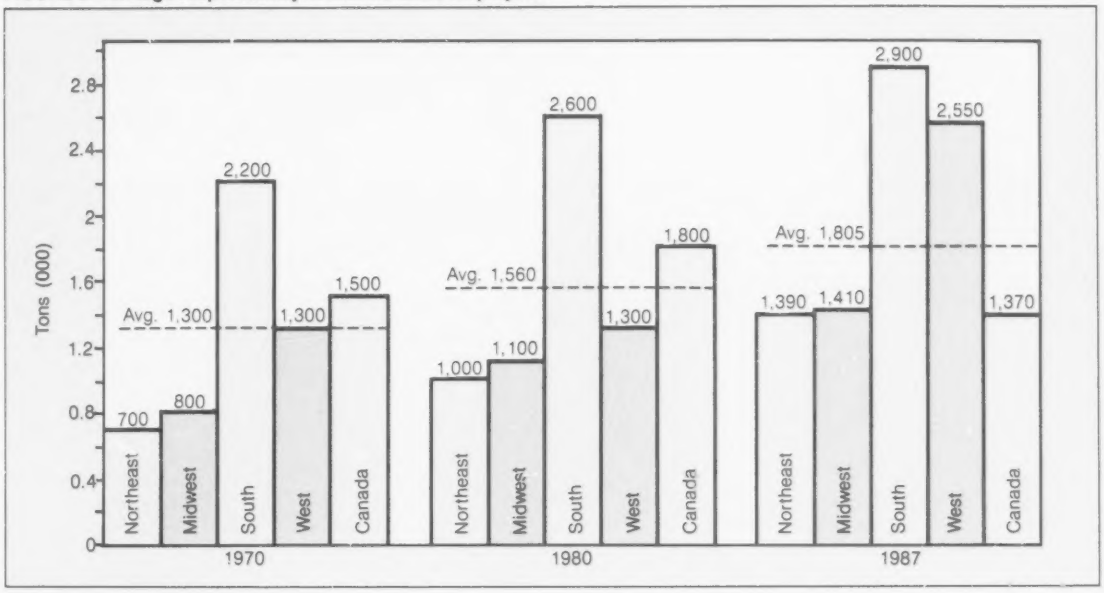
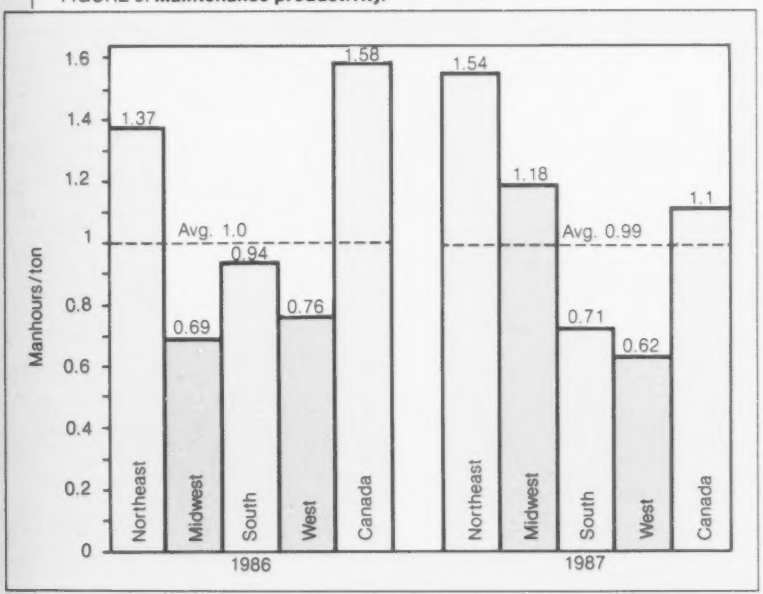



*FIGURE 3:* **Maintenance productivity.**




Probably because of their effective preventive maintenance programs, southern and Canadian mills replaced the fewest (6%) of their electric motors and rotary joints each year (Table 2). However, these mills replaced the most paper machine dryer section bearings (5% and 6%, respectively). It has been said that mills with preventive maintenance vibration monitoring programs will replace more bearings than those mills without such programs with the benefit of reduced unplanned downtime. These statistics seem to prove that theory.

Respondents were asked what modern preventive maintenance methods they use. Systematic vibration monitoring proved to be the most popular. In Canada, 100% of the mills use this technique, and in the South 93% use it. The second most popular technique, infrared temperature measurement of electrical connections, is used by 100% of Canadian respondents, 100% of the western mills surveyed, and 79% of southern mills. Other popular techniques include spectrometric oil analysis, ultrasonic testing of materials, and infrared temperature measurement of other equipment. Metal spraying has apparently been tried by a number of mills with less than satisfactory results, according to survey respondents.

**COMPARISON WITH PREVIOUS SURVEYS.** Prior to 1986 and 1987, *P&P* conducted one other maintenance survey in 1980. Comparison of survey results shows a few trends in North American maintenance practices. In 1980, mills reported an average of 11% of their maintenance budgets was spent on outside contractors (Figure 1). In 1986 that average jumped to 14% for all regions, and in 1987 it rose again to 15%. As previously stated, southern mills led the way, spending an average of 20% of their maintenance budgets on contractors. Some 44% of southern

mills say they plan to increase spending on outside contractors in 1988, so this trend seems likely to continue.

In 1980, the average tonnage responsibility for each maintenance employee was 1,560. In 1986 that figure rose to 1,815, and this year that figure was 1,805. It is unclear whether maintenance productivity will continue to rise. As production processes are automated, maintenance workers are becoming an increasingly larger portion of the overall mill work force. This year maintenance workers averaged 21% of all workers over all regions. In some Swedish mills, such as Svenska Cellulosa AB's Östrand mill, this figure reaches as high as 40%. Fifteen years ago, maintenance workers were about 25% of the work force in a typical Swedish mill. Today that figure is closer to 31%. As North American mills become more sophisticated in their preventive maintenance programs, the percentage of maintenance workers is likely to continue to rise.

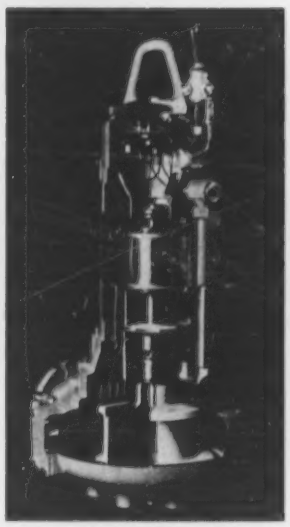
One figure that has stayed fairly constant is the number of supervisors per 100 mechanics. In 1980, it was 11.4. In 1986, it was 11.8, and in 1987 it averaged 11.2.

**CONCLUSION.** Southern mills, due to the economies of scale and their more flexible labor relations, excel in almost every category of maintenance productivity in this survey. They have gone far in implementing preventive maintenance programs—as have the Canadian mills. However, preventive maintenance is not cheap. Southern mills report that an average of 26% of their mill operating budgets is charged to the maintenance department! As previously stated, southern mills report an average of 16% of the maintenance budget devoted to preventive maintenance programs. Obviously, for many of these mills that operate 365 days/year, unscheduled downtime is far more expensive.

One respondent wrote that he is forced to ignore survey results due to the wide variation in the definition of terms such as "unplanned downtime," "availability," and even "maintenance workers." He said that "apples don't taste like oranges." Unfortunately, this is true, and a comparison of your mill's numbers with these survey results may be difficult. However, it is likely that mill maintenance will become more sophisticated in its techniques and, therefore, more expensive. Maintenance managers will be challenged to continue to reduce unplanned downtime with preventive maintenance programs, while trying to check rising maintenance costs. The editors of *Pulp &Paper* welcome your input in trying to make this survey more meaningful. ■

*Maintenance force productivity, preventive maintenance techniques, and the use of outside contractors will be the focus of presentations at* Pulp And Paper Maintenance '87, *a two-and-a-half-day conference sponsored by* Pulp & Paper *and PBI Maintenance Inc. to be held in Atlanta, Ga., Nov. 9-11, 1987. For more details, see p. 286 in this issue.*


# The Davis/EMU challenge... can your pump meet or beat it?



At DAVIS/EMU, we've issued the challenge. Can your pump manufacturer meet or beat our units, across the board, for product specifications, warranty, parts and service back up and engineering support? We don't think so! Here's why.

Where else but DAVIS/EMU can you get a submersible or non-submersible pump with positive oil cooling, silicon carbide shaft seals, a one piece solid stainless steel shaft and other features for long life and durability?

In addition, what other manufacturer besides DAVIS/EMU offers a **full** two (2) year warranty that is not limited by running time? Also, where else can you be guaranteed a delivery time for parts and service? And lastly, where can you find an engineering department to complement your special requirements? Hands down, it's DAVIS/EMU.

But don't just take our word for it. Ask your pump supplier or manufacturer to meet or beat the above. Then, when he gives you the excuses or "conditions" call DAVIS/EMU. Our challenge will bring action.

DAVIS

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